



Robert Mancini
Project Manager, Downstream
Chevron Environmental Management Company
1200 State Street
Perth Amboy, NJ 08861
Tel: (732) 738-2023
Fax: (732) 738-2039
RMancini@Chevron.com

March 24, 2020

Mr. Ricky Vargas
Land and Redevelopment Program Branch
Land, Chemicals and Redevelopment Division
United States Environmental Protection Agency, Region 2
290 Broadway, 25th Floor
New York, New York 10007

Re: Catalyst Beads
Former Chevron Perth Amboy Facility
Perth Amboy, New Jersey
SRP PI # 003621

Dear Mr. Vargas:

INTRODUCTION

The United State Environmental Protection Agency (USEPA) and New Jersey Department of Environmental Protection (NJDEP) provided comments on the Solid Waste Management Unit (SWMU) 40 Ex Situ Stabilization (ESS) Construction Completion Report (CCR) (Chevron 2017) and SWMUs 5/21/43 Corrective Measure (CM) Implementation Work Plan (IWP) (Chevron 2018) submitted for the former Chevron Perth Amboy Facility at 1200 State Street, Perth Amboy New Jersey (Facility). Among the comments was a request for further discussion about the occurrence of catalyst beads in the fill material at the Facility. The specific comment provided by the Agencies is as follows:

- NJDEP stated that the Department is well acquainted with another refinery that as part of pilot study to enhance the refining/cracking process, impregnated catalyst beads made of aluminosilicate material (ASM) with polychlorinated biphenyls (PCBs, specifically Aroclor 1254). Except for a brief notation in the documents prepared for SWMU 40 and SWMU 43, the Department is unaware of any other references to catalyst beads at the site. As such, EPA and NJDEP request additional discussion on the use, composition, potentially associated contaminants, and disposal practices of these catalyst beads at the Former Chevron Perth Amboy Refinery in a separate document. Chevron should clarify where these catalyst beads have been encountered (i.e. soil borings, areal extent, etc.) at this and other AOCs/SWMUs and if any have been disposed of within the on-site Corrective Action Management Unit (CAMU). Please note, EPA and NJDEP do not consider catalyst beads as historic fill material such that they must be evaluated and addressed prior to finalizing the corrective measure (CM) for the site-wide historic fill.

The presence of catalyst beads in the fill material at the Facility was noted in the Description of Current Conditions (DOCC) (Chevron 1994), 1st Phase RCRA Facility Investigation Report (RFI) Report (Chevron 1997), Full RFI Report (Chevron 2003), Supplemental RFI Report (Chevron 2008a), and Corrective Measures Study (CMS) Final Report (Chevron 2008b). Additionally, the 2013 HSWA Permit identifies SWMU 29, SWMU 40, and SWMU 43 as areas where catalyst beads are present in the fill material.

This letter discusses the areas of the Facility where catalyst beads have been encountered and/or excavated for placement in the on-site CAMU, the composition of catalyst beads used at the Facility, the use and disposal practices of catalyst beads at the Facility, and potential contaminants associated with catalyst beads.

SUMMARY OF LOCATIONS OF CATALYST BEADS

Logs for soil borings advanced throughout the Central, East, and Main Yards of the Facility were reviewed for the indication of catalyst beads in the fill material. A brief discussion of the presence of catalyst beads identified in fill material across the Facility is provided below by yard.

In the Central Yard, trace amounts of catalyst beads at different depths in the fill material were observed in three soil borings (SB-0143, SB-0148, and S2453) within SWMU 34 and two soil borings (S4289 and S5024) within area of concern (AOC) 25/potential AOC (PAOC) 74 (Figure 1). SWMU 34 is described as an area in which spent catalyst from a sulfur recovery unit was placed in dumpsters for off-site disposal. The area designated as AOC 25/PAOC 74 is in the northwestern corner of the Central Yard and is the location of a former catalytic cracker unit. The catalyst beads identified in the Central Yard are randomly distributed throughout the fill material in these two areas and do not define a distinct layer that would indicate the potential presence of a disposal area.

In the East Yard, 11 soil borings (SB-0236, S1410, S1412, S2394, S2886, S2893, S2940, S4754, S4835, S4985, and S5320) were identified as containing catalyst beads in the fill material (Figure 2). Trace amounts (up to 15%) to some (approximately 15% to 30%) catalyst beads were observed to be mixed with fill material at varying depths in these East Yard soil borings. The catalyst beads identified in the East Yard do not define a distinct layer that would indicate a potential disposal area. SWMU 8 was identified as an area containing two 20-foot by 20-foot tetraethyl lead (TEL) sludge burials that required ex situ stabilization (ESS) to remediate lead and TEL impacts in soil. Soil borings SB-0236, S2886, S2893, S4754, S4835, and S4985 are located within the boundary of SWMU 8 that was excavated during the ESS CM implementation (CMI), as depicted on Figure 3. Soil surrounding these borings containing catalyst beads was excavated and placed in the CAMU for disposal.

Based on review of soil boring logs, five separate Main Yard areas were identified as containing significant amounts of catalyst beads in the fill material overlying the native soil. The five areas include SWMU 7, SWMU 19, SWMU 39, SWMU 40, and SWMU 43. Soil borings in the Main Yard containing catalyst beads are depicted on Figure 4. The ESS CM was implemented in SWMUs 7, 19, 39, and 40 to remediate lead, benzo(a)pyrene (BaP), and TEL impacts in soil. Soil excavated from these areas for placement in the on-site CAMU contained catalyst beads. In accordance with

the IWPs prepared for each area and in accordance with the in situ stabilization (ISS)/ESS Final Design Report (FDR) (Chevron 2016), soil samples were collected from each ESS area to confirm compliance with the CAMU acceptance criteria (Toxicity Characteristic Leaching Procedure [TCLP] lead < 7.5 milligrams per liter [mg/L], TCLP arsenic < 50 mg/L, BaP < 34 mg/kg, benzene < 100 mg/kg) prior to placement in the CAMU. The SWMU 7, SWMU 19, SWMU 39, and SWMU 40 ESS areas are depicted on Figures 5 through 8.

COMPOSITION OF CATALYST BEADS

Catalysts have been used in the petroleum refining industry to convert crude oil to gasoline since 1937. Eugene Jules Houdry developed the Houdry Process which involved the use of a catalyst to convert vaporized petroleum to gasoline. The catalyst used in the Houdry Process was a clay mineral called Fuller's Earth, which is a naturally occurring aluminosilicate. The production of synthetic silica-alumina catalyst began in 1940 at the Socony-Vacuum Oil Company (later Mobil Oil Corporation) in Paulsboro, New Jersey (American Chemical Society National Historic Chemical Landmarks 2020).

Aluminosilicate catalyst beads were used in the refining of crude oil at the former Chevron Perth Amboy Facility. Advances in petroleum refining involved coating the aluminosilicate catalyst beads with nickel, vanadium, platinum, palladium, rhenium, and other noble metals. PCBs, including the congener Aroclor 1254, were not used in the refining processes performed at the former Chevron Perth Amboy Facility.

USE AND DISPOSAL PRACTICES OF CATALYST BEADS

Catalyst beads were used in the refining of crude oil to produce various end products (e.g., gasoline, asphalt). SWMU 40 and SWMU 43 were used as spent catalyst disposal areas in the mid-1950s. SWMU 29, which is included in the footprint of SWMU 39, was used as a spent catalyst storage area before the catalyst was transferred into dumpsters for off-site disposal.

POTENTIAL CONTAMINANTS ASSOCIATED WITH CATALYST BEADS

The potential contaminants associated with the catalyst beads include such petroleum-related compounds as:

- Benzene and other volatile organic compounds,
- BaP and other polycyclic aromatic hydrocarbons, and
- Lead and other metals.

The areas where significant amounts of catalyst beads were identified were investigated as part of the 1st Phase RFI (Chevron 1997), Full RFI (Chevron 2003), Supplemental RFI (Chevron 2008a), and CMS (Chevron 2008b). These areas were also investigated and remediated as part of the CMI that is currently in progress at the Facility. The primary constituents of concern that are being addressed by the CMI include benzene, lead/TCLP lead, TEL, arsenic, and BaP.

As stated previously, PCBs were not used in the refining processes performed at the former Chevron Perth Amboy Facility. Therefore, PCBs are not considered to be a constituent of concern in soil or groundwater at the former Chevron Perth Amboy Facility.

CONCLUSIONS

Catalyst beads were identified in the fill material in several areas throughout the Facility, particularly in SWMU 7, SWMU 19, SWMU 39, SWMU 40, and SWMU 43. Catalyst beads used in the refining of crude oil at the Facility were initially made of naturally occurring aluminosilicate (i.e., Fuller's Earth). Later, with the advances in catalytic cracking technology, the catalyst beads consisted of synthetic aluminosilicates and zeolites coated with nickel, vanadium, platinum, palladium, rhenium, and other noble metals. PCBs were not used in the refining processes performed at the Facility and are not considered to be a potential contaminant in fill material.

REFERENCES

- American Chemical Society National Historic Chemical Landmarks. The Houdry Process for Catalytic Cracking.
<http://www.acs.org/content/acs/en/education/whatischemistry/landmarks/houdry.html>
(accessed February 11, 2020).
- Chevron. 1994. Description of Current Conditions, Chevron Perth Amboy Facility, Perth Amboy, New Jersey.
- Chevron. 1997. 1st Phase RFI Soils Report. June.
- Chevron. 2003. Full RCRA Facility Investigation Report. November.
- Chevron. 2008a. Supplemental RFI Report, Chevron Perth Amboy Facility, NJ. February.
- Chevron. 2008b. Corrective Measures Study Final Report for the Main Yard, East Yard, and Central Yard Chevron Perth Amboy Refinery, Perth Amboy, New Jersey. November.
- Chevron. 2016. In Situ Stabilization (ISS)/Ex Situ Stabilization (ESS) Final Design Report. May.
- Chevron. 2017. Ex Situ Stabilization Construction Completion Report – Solid Waste Management Unit 40. November.
- Chevron. 2018. Corrective Measures Implementation Work Plan – Solid Waste Management Units 5/21/43. September.

CLOSING

Based on the information presented herein, investigation of PCBs associated with the spent catalyst beads identified in fill material at the former Chevron Perth Amboy Facility is not warranted. Chevron requests approval by USEPA and NJDEP of this request for a No Further Action determination for PCBs at the former Chevron Perth Amboy Facility. If you require additional information for your review, please contact me at (732) 738-2023.

Sincerely,

Robert Mancini
Project Manager, Downstream

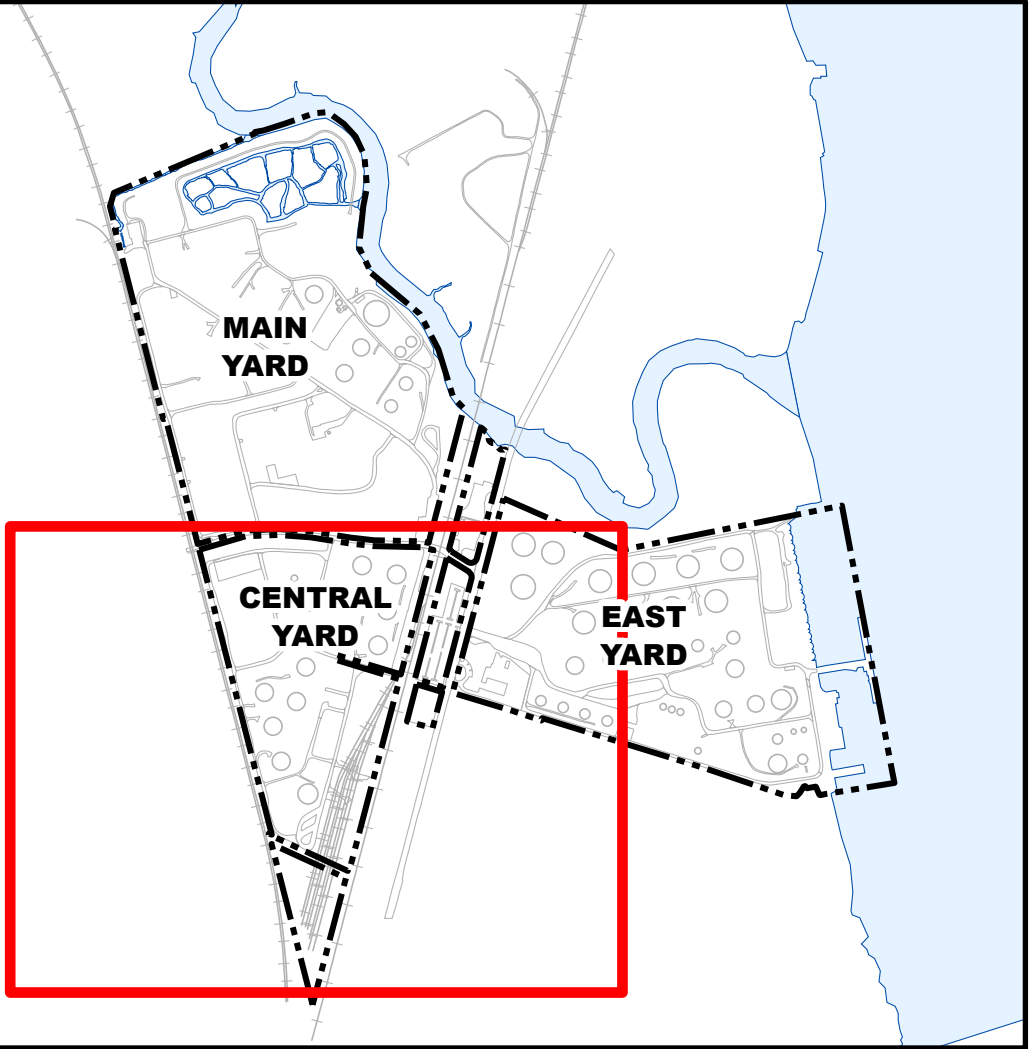
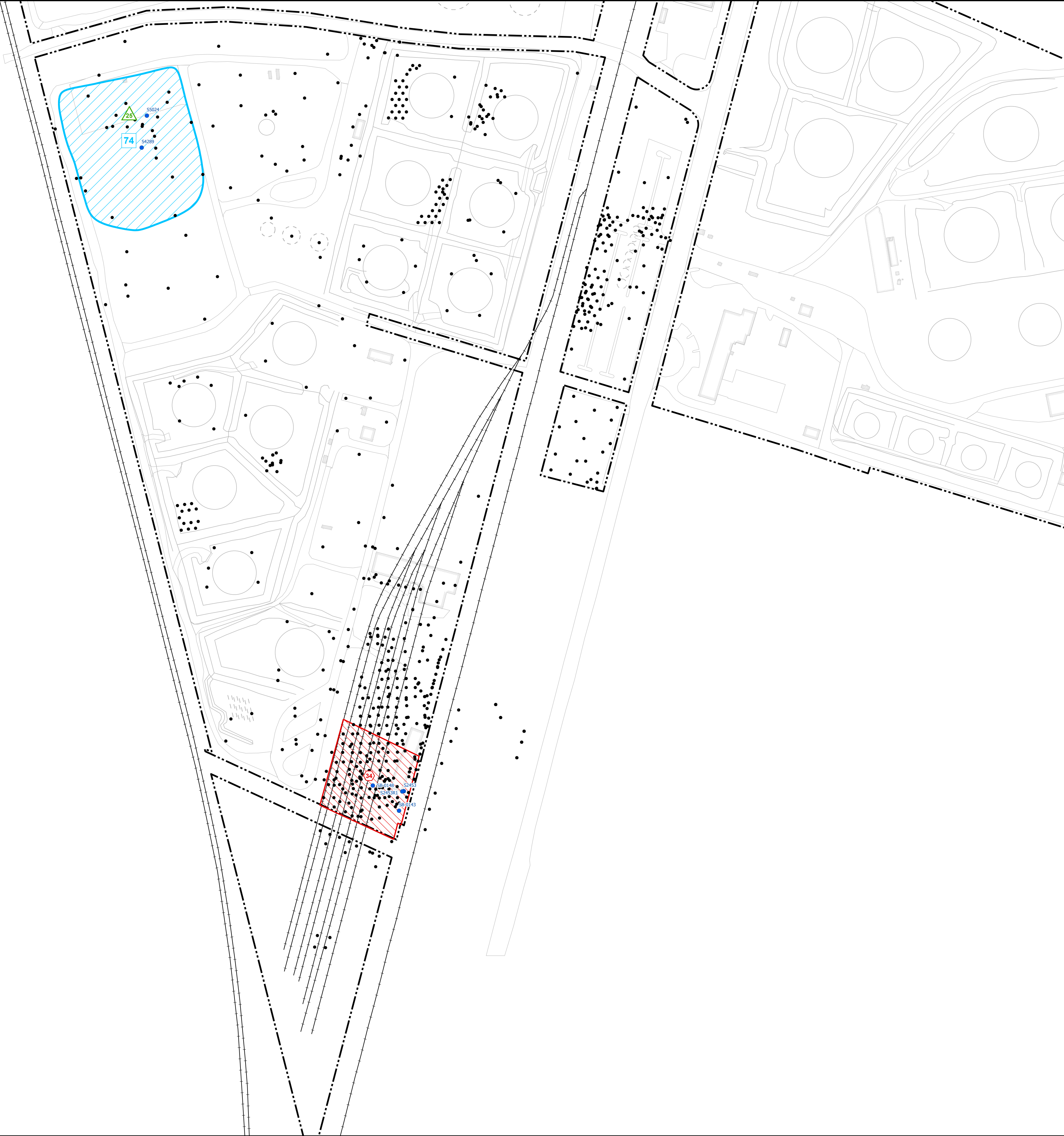
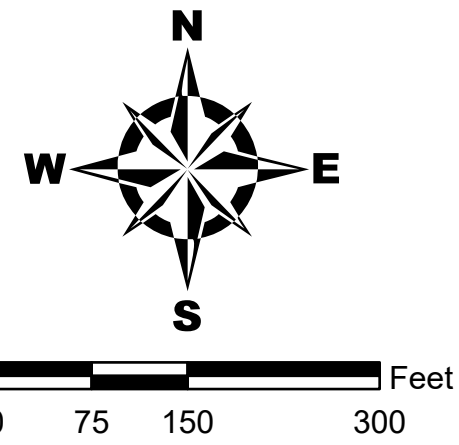
cc:
Charlie Zielinski – NJDEP, Bureau of Case Management
Brendan Leehan – Buckeye Partners LLC

ATTACHMENTS

- Figure 1 – Central Yard Catalyst Bead Locations
- Figure 2 – East Yard Catalyst Bead Locations
- Figure 3 – SWMU 8 Catalyst Bead Locations and Remediation Areas
- Figure 4 – Main Yard Catalyst Bead Locations
- Figure 5 – SWMU 7 and 40 Catalyst Bead Locations and Remediation Areas
- Figure 6 – SWMU 19 Catalyst Bead Locations and Remediation Areas
- Figure 7 – SWMU 39 Catalyst Bead Locations and Remediation Areas
- Figure 8 – SWMU 43 Catalyst Bead Locations and Remediation Areas

ATTACHMENTS

Path: I:\gem02\401\Projects\Projects\Chevron\DMIS\Projects\ISS-ESS\Siewide\Catalyst Beads Report\aprx

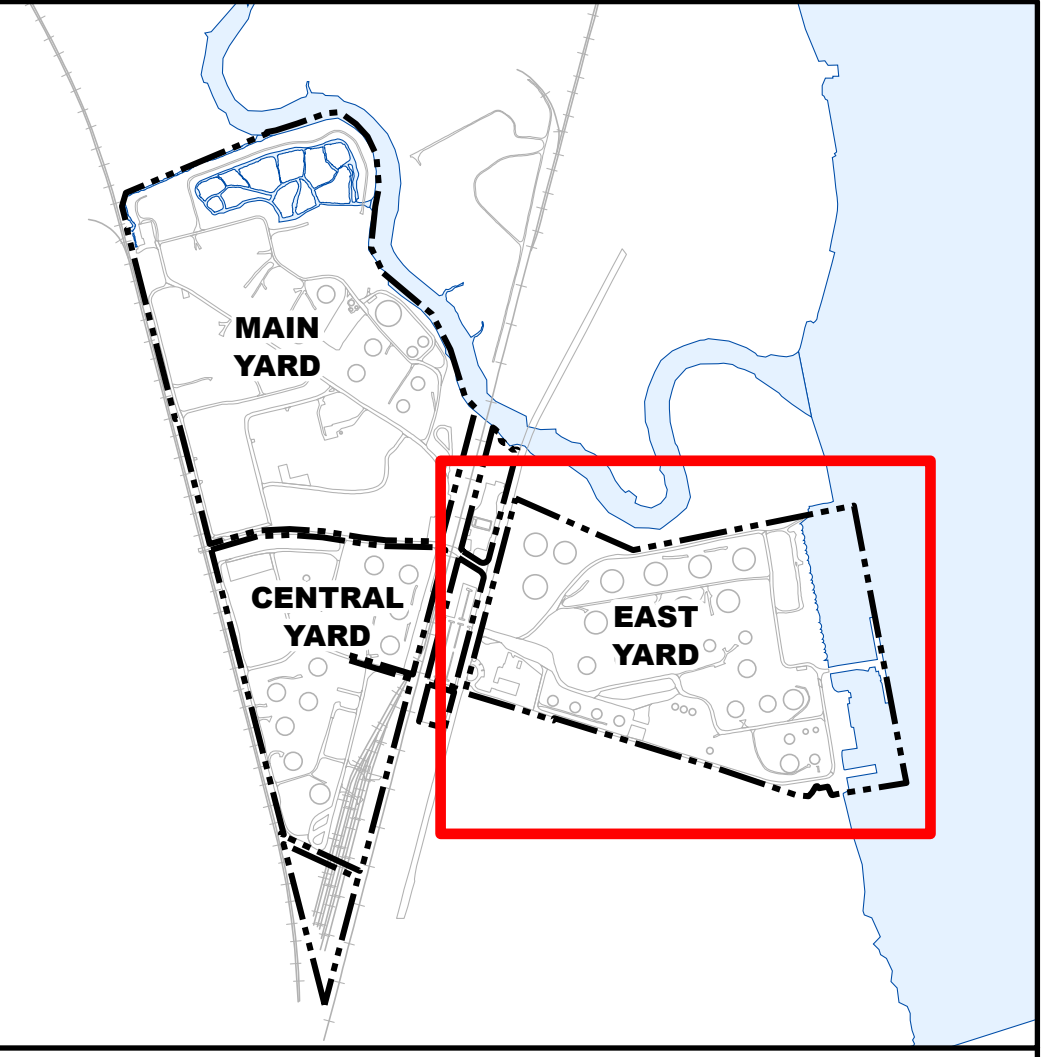
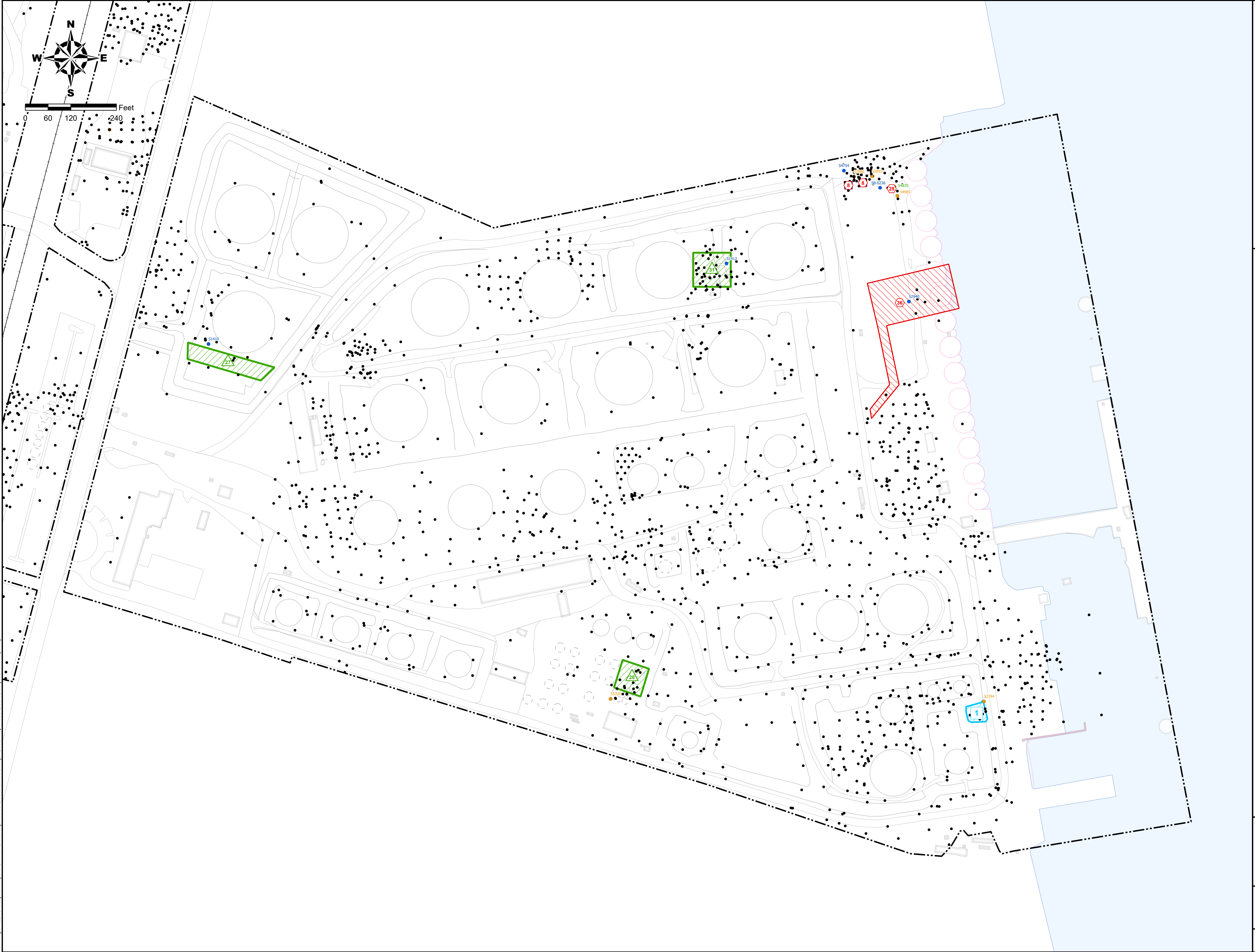


Legend

Catalyst Beads Present	Property Line
Traces - Less Than 15% of Catalyst Beads Present	Railroad
Soil Boring - No Catalyst Beads Identified	Tank Status
AOC Boundary	Current
PAOC Boundary	Demolished
SWMU Boundary	Tank Berms
	Buildings

CENTRAL YARD CATALYST BEAD LOCATIONS CATALYST BEADS REPORT				
		CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY PERTH AMBOY, NEW JERSEY		
PROJECT #: 452038-02000	DATE: 3/9/2020	DWN: TDU	CHKD: JL	FIG NO.: 1

Path: U:\jtem02\401\Projects\Projects\Chevron\DMIS\Projects\ISS-ESS\SiteWide\Catalyst Beads Report.aprx




Legend

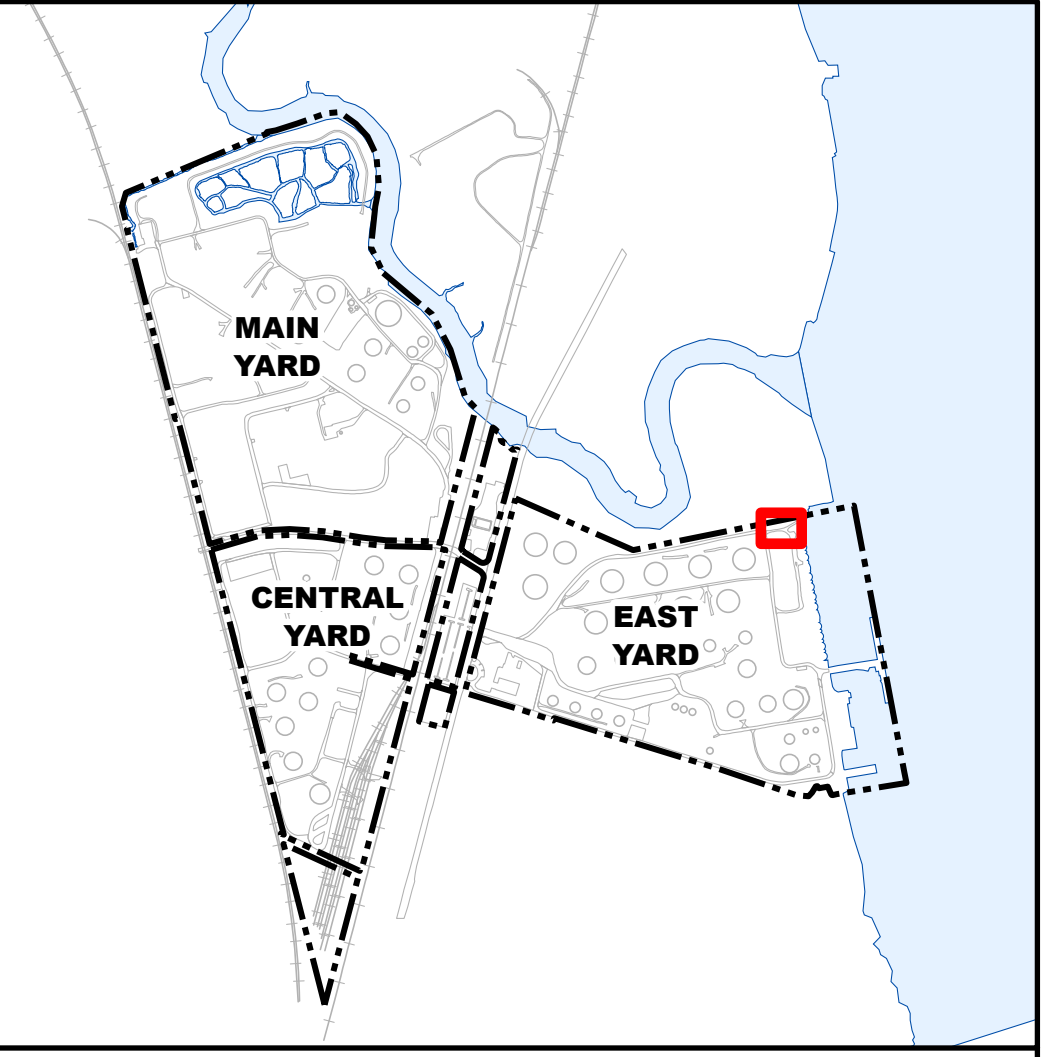
● Abundant - Greater Than 30% Catalyst Beads Identified Soil	■ Suspected TEL Burial Area
● Some - Approximately 15% to 30% Catalyst Beads Present with Gravel, Sand, and Silt	□ Property Line
● Traces - Less Than 15% of Catalyst Beads Present	— Railroad
● Soil Boring - No Catalyst Beads Identified	□ Tank Status
▨ AOC Boundary	□ Current
▨ PAOC Boundary	□ Demolished
▨ SWMU Boundary	— Tank Berms
	□ Buildings
	— Sheet Piling
	— Bulk Head

EAST YARD CATALYST BEAD LOCATIONS

CATALYST BEADS REPORT

 CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
PERTH AMBOY, NEW JERSEY

PROJECT #: 452038-02000	DATE: 3/9/2020	DWN: TDU	CHKD: JL	FIG NO.: 2
----------------------------	-------------------	-------------	-------------	---------------



Legend

●

Abundant - Greater Than 30% Catalyst Beads Identified Soil

●

Some - Approximately 15% to 30% Catalyst Beads Present with Gravel, Sand, and Silt

●

Traces - Less Than 15% of Catalyst Beads Present

●

Suspected TEL Burial Area


Property Line

Tank Berms

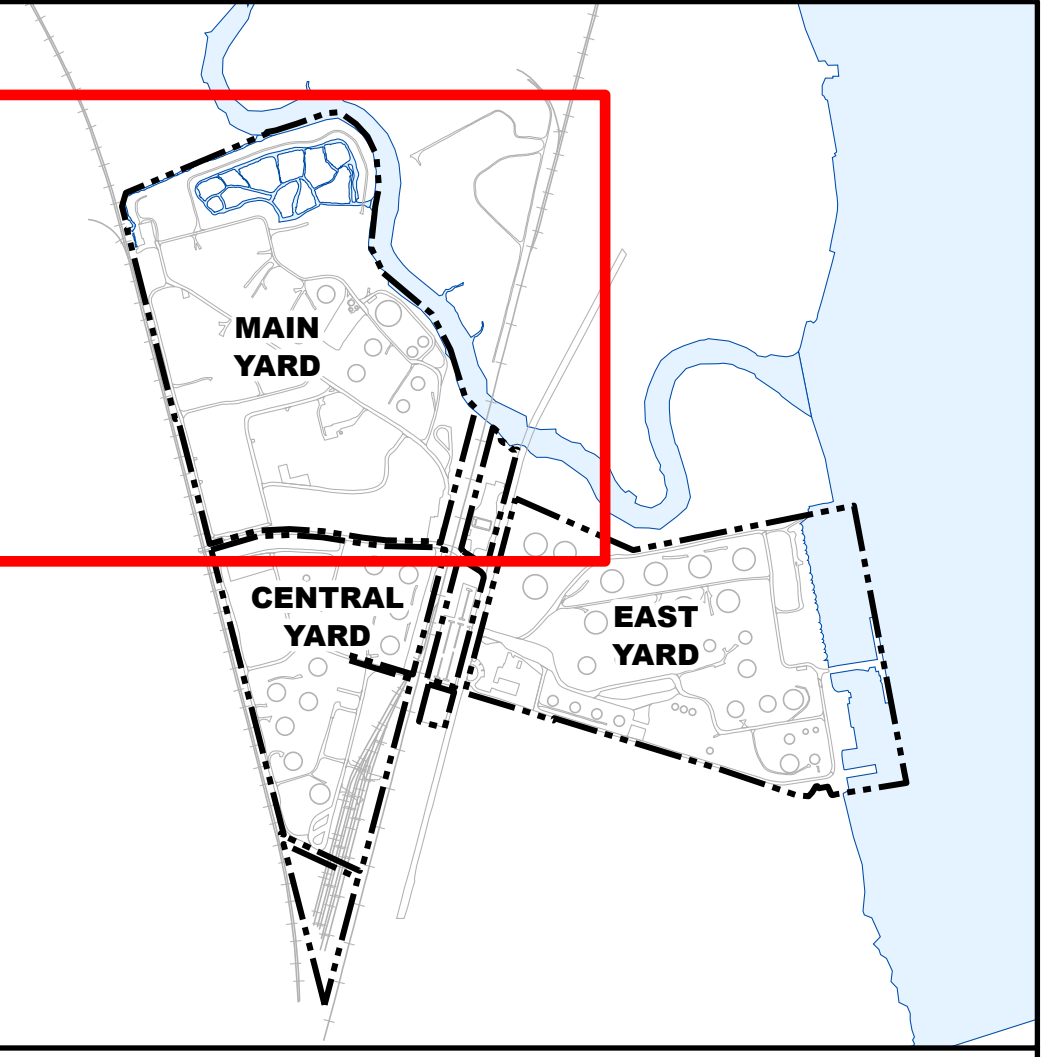
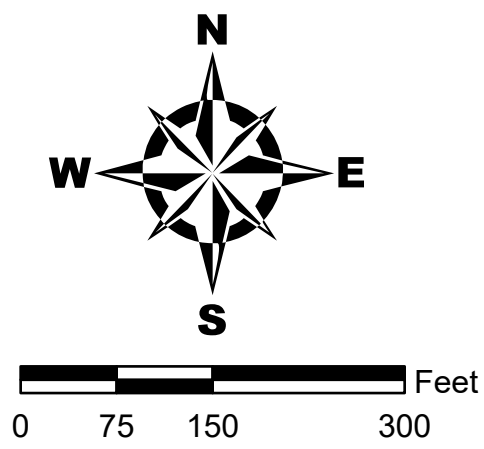
Sheet Piling

GENERAL NOTE:
Aerial photograph dated October 2017 was provided by Parsons.

**SWMU 8
CATALYST BEAD LOCATIONS
AND REMEDIATED AREAS
CATALYST BEADS REPORT**

		CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY PERTH AMBOY, NEW JERSEY			
PROJECT #:	DATE:	DWN:	CHKD:	FIG NO.:	
452038-02000	3/24/2020	TDU	JL	3	

Path: \\ngjem02\401\Projects\Projects\Chevron\DMSP\Projects\ISS-ESS\SiteWide\Catalyst Beads Report\aprx



Legend

Catalyst Beads Present

- Abundant - Greater Than 30% Catalyst Beads Identified Soil
- Some - Approximately 15% to 30% Catalyst Beads Present with Gravel, Sand, and Silt
- Traces - Less Than 15% of Catalyst Beads Present
- Soil Boring - No Catalyst Beads Identified

Other Features

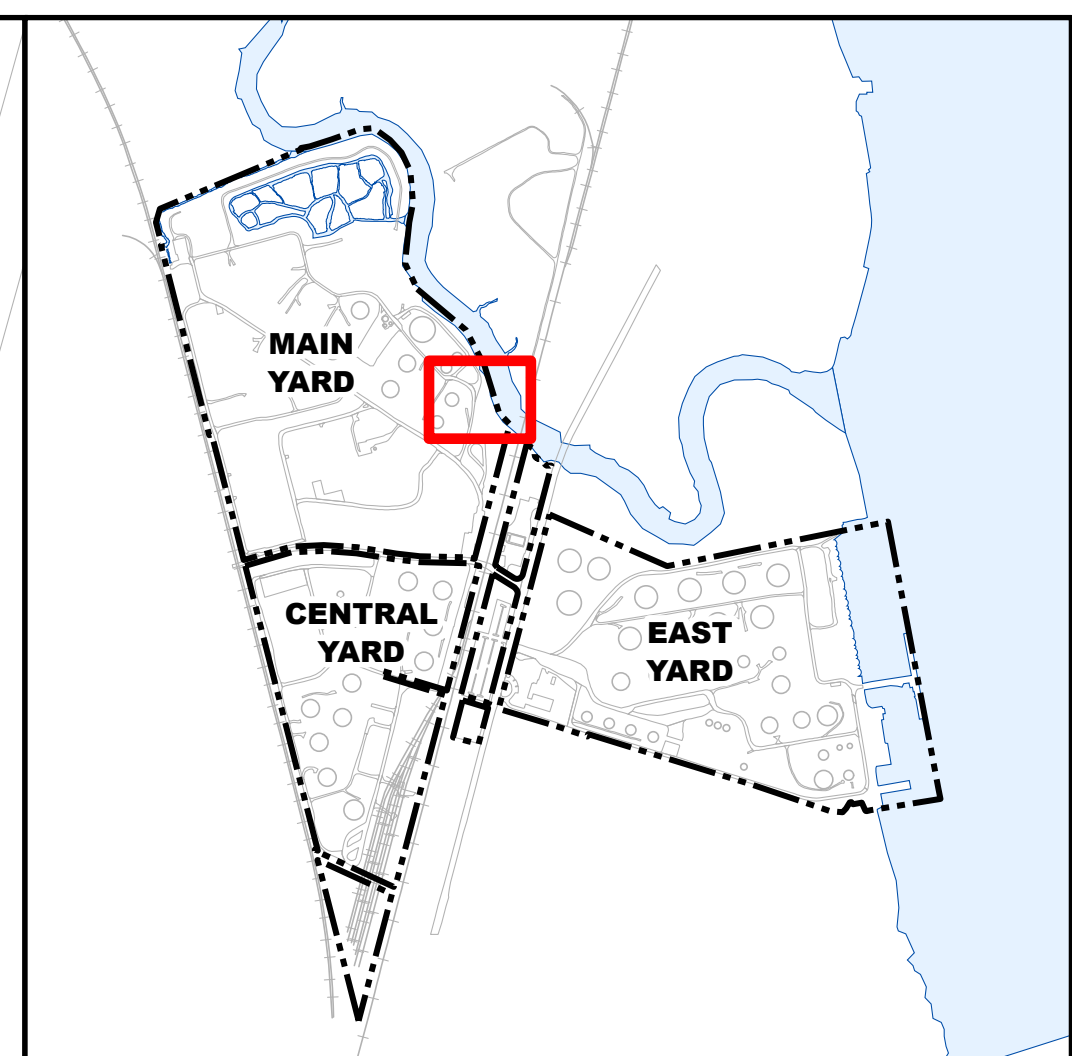
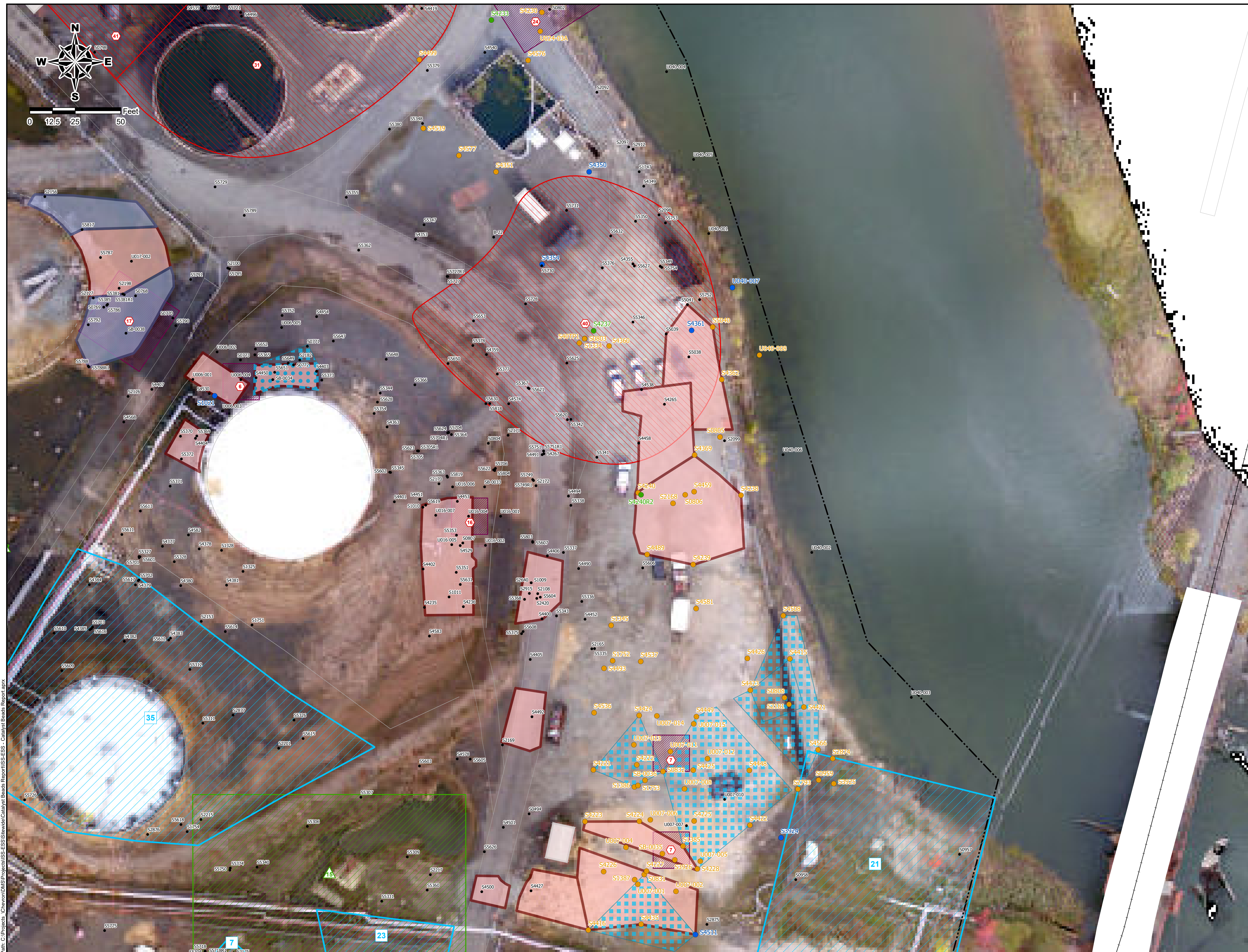
- AOC Boundary
- PAOC Boundary
- SWMU Boundary
- Suspected TEL Burial Area
- Property Line
- Railroad
- Tank Status
 - Current
 - Demolished
- Tank Berms
- Buildings
- Sheet Piling
- Slurry Wall

MAIN YARD CATALYST BEAD LOCATIONS



CATALYST BEADS REPORT




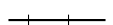




Chevron ENVIRONMENTAL MANAGEMENT COMPANY
PERTH AMBOY, NEW JERSEY

PROJECT #: 452038-02000	DATE: 3/10/2020	DWN: TDU	CHKD: JL	FIG NO.: 4
----------------------------	--------------------	-------------	-------------	---------------



Legend

- Abundant - Greater Than 30% Catalyst Beads Identified Soil
 - Some - Approximately 15% to 30% Catalyst Beads Present with Gravel, Sand, and Silt
 - Traces - Less Than 15% of Catalyst Beads Present
 - Soil Boring - No Catalyst Beads Identified
-  AOC Boundary
 -  PAOC Boundary

-  SWMU Boundary
 -  Suspected TEL Burial Area
 -  Property Line
 -  Railroad
 - ### Tank Status
 -  Current
 -  Demolished
 -  Tank Berms
 -  Buildings

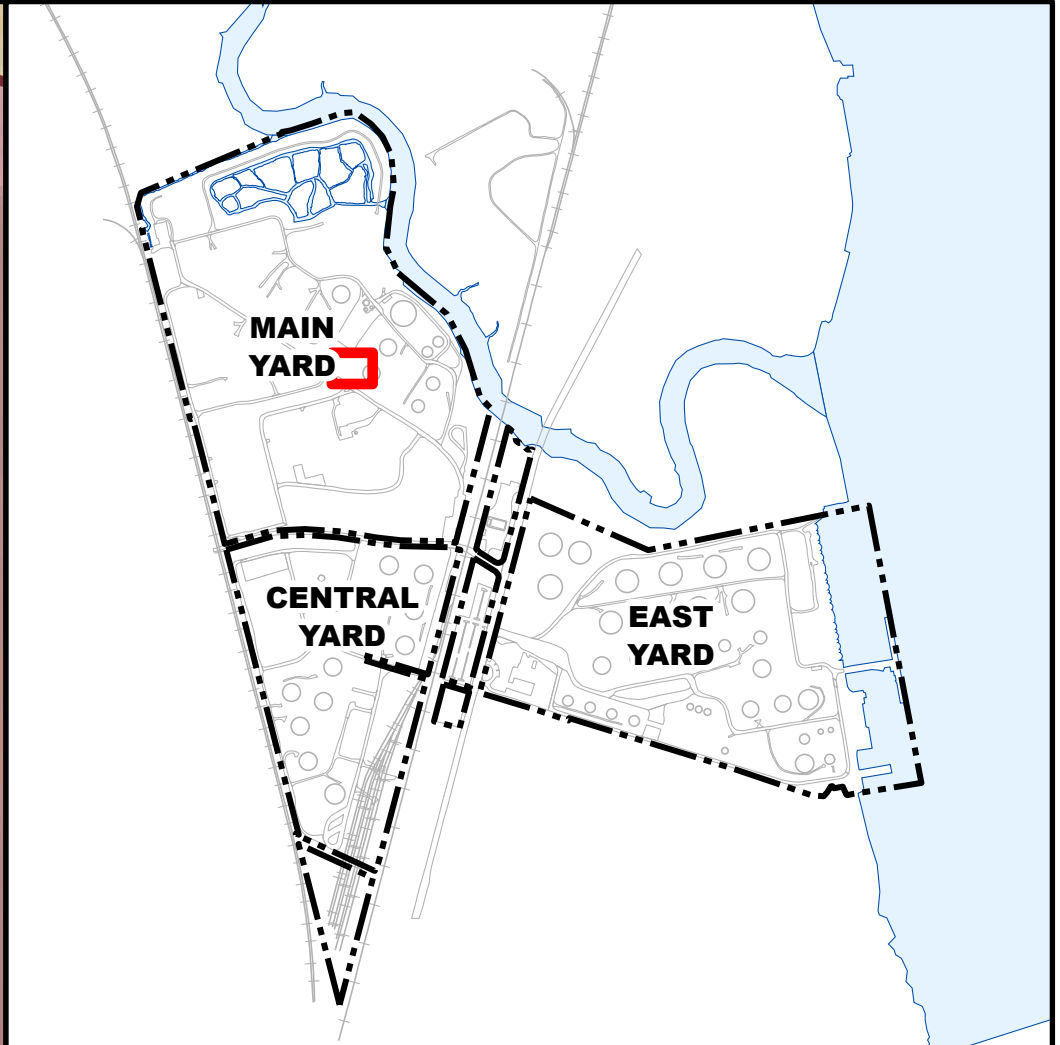
GENERAL NOTE:
Aerial photograph dated October 2017 was provided by Parsons.

SWMU 7 AND 40 CATALYST BEAD LOCATIONS AND REMEDIATED AREAS CATALYST BEADS REPORT



CHEVRON
ENVIRONMENTAL MANAGEMENT COMPANY
PERTH AMBOY, NEW JERSEY


PROJECT #:	DATE:	DWN:	CHKD:	FIG NO.:
452038-02000	3/24/2020	TDU	RS	5



Legend

- Abundant - Greater Than 30% Catalyst Beads Identified Soil
- Some - Approximately 15% to 30% Catalyst Beads Present with Gravel, Sand, and Silt
- Traces - Less Than 15% of Catalyst Beads Present
- Soil Boring - No Catalyst Beads Identified
- PAOC Boundary
- Suspected TEL Burial Area
- Property Line
- Tank Status
 - Current
 - Buildings

GENERAL NOTE:
Aerial photograph dated October 2017 was provided by Parsons.



CHEVRON
ENVIRONMENTAL MANAGEMENT COMPANY
PERTH AMBOY, NEW JERSEY

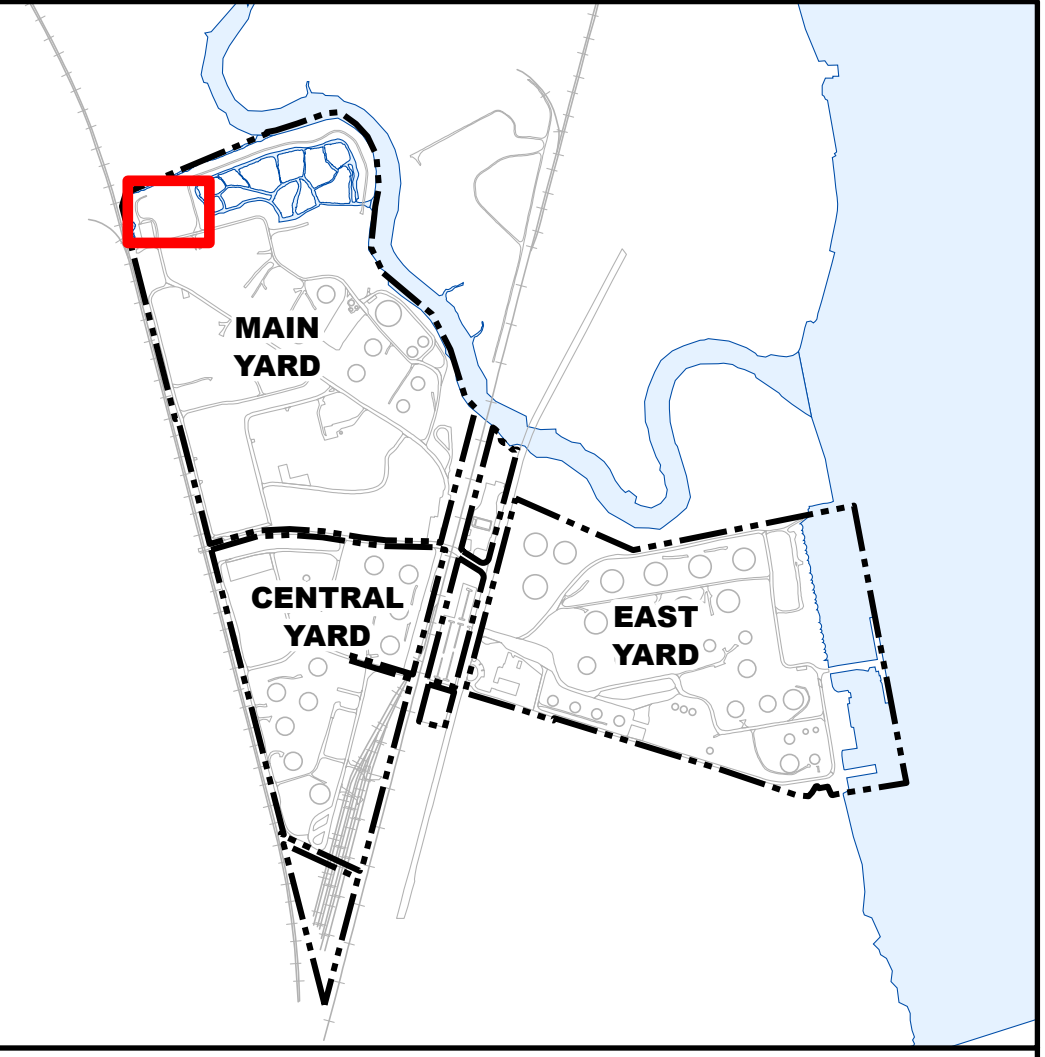
PROJECT #:
452038-02000

DATE:
3/24/2020

DWN:
TDU

CHKD:
JL

FIG NO.:
6



Legend

●

Abundant - Greater Than 30% Catalyst Beads Identified Soil

●

Some - Approximately 15% to 30% Catalyst Beads Present with Gravel, Sand, and Silt

●

Traces - Less Than 15% of Catalyst Beads Present

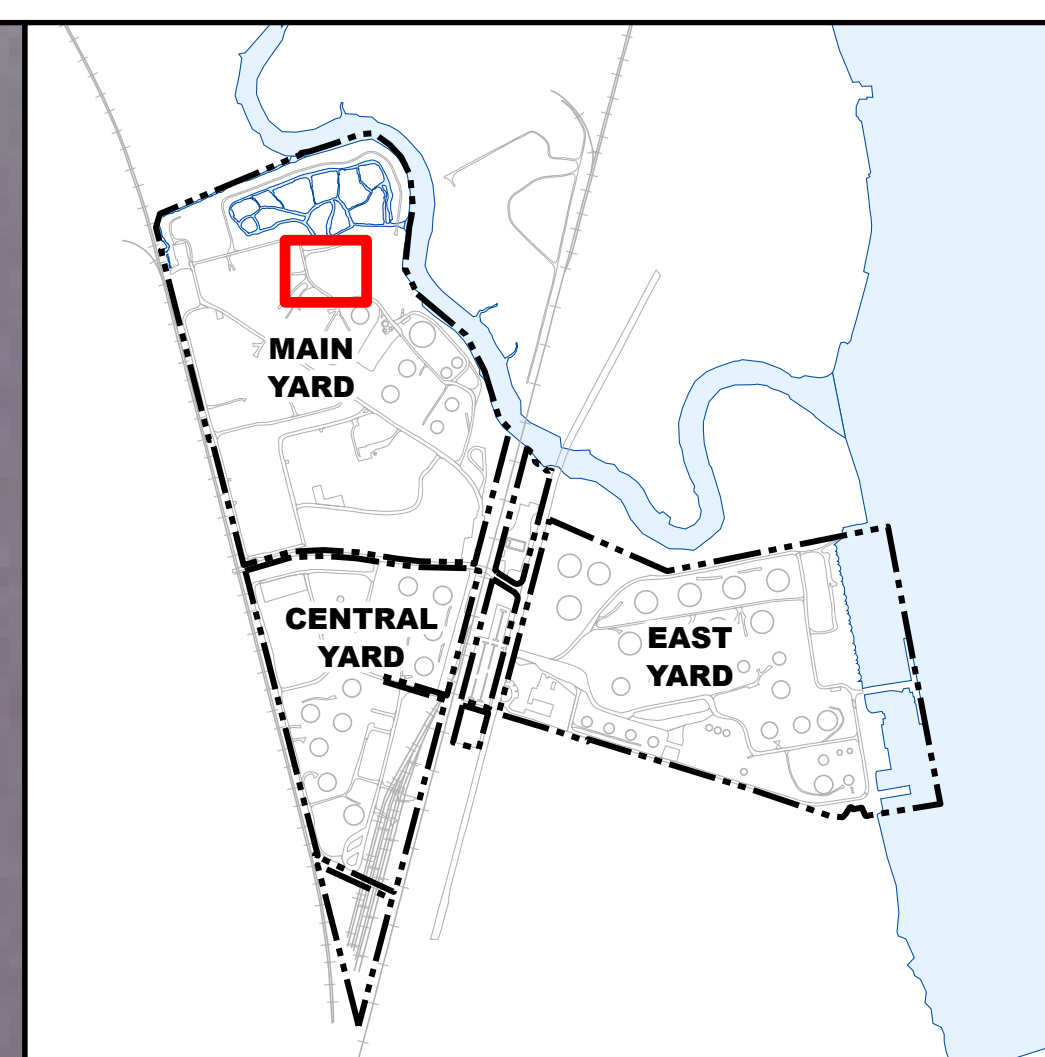
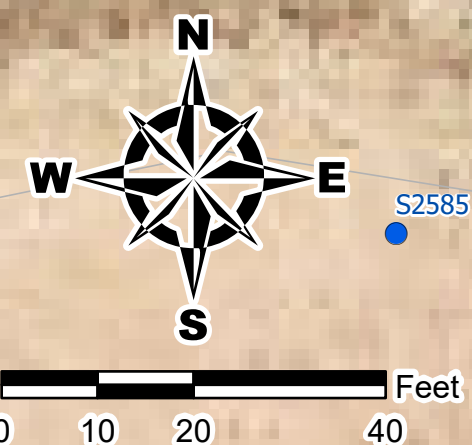
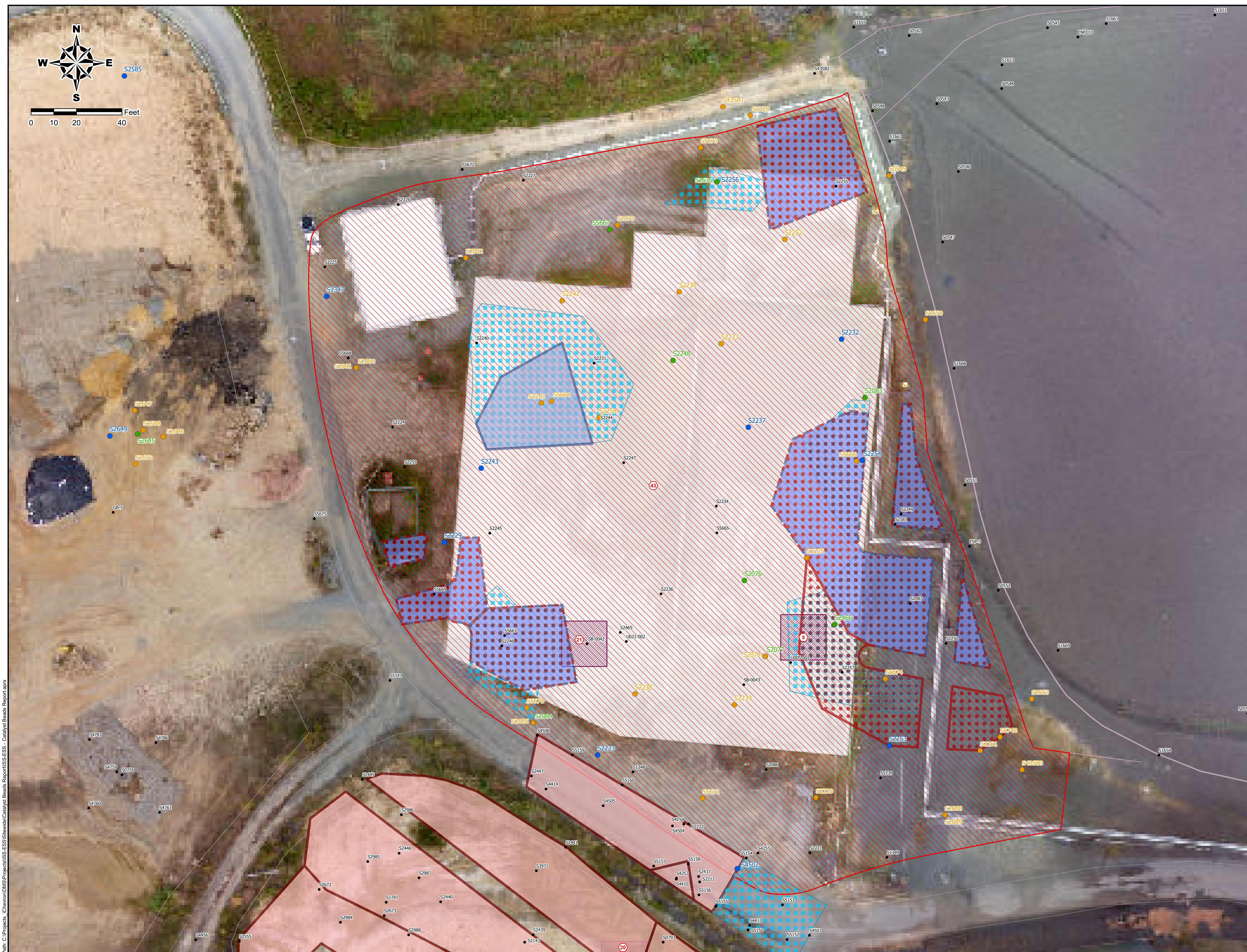
●

AOC BoundarySWMU BoundaryProperty LineTank StatusDemolishedTank BermsBuildings













GENERAL NOTE:
Aerial photograph dated October 2017 was provided by Parsons.

**SWMU 39
CATALYST BEAD LOCATIONS
AND REMEDIATED AREAS
CATALYST BEADS REPORT**

		CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY PERTH AMBOY, NEW JERSEY			
PROJECT #:	DATE:	DWN:	CHKD:	FIG NO.:	
452038-02000	3/24/2020	TDU	JL	7	




Legend

- | | | | |
|---|--|--|---------------------------|
| ● | Abundant - Greater Than 30% Catalyst Beads Identified Soil |  | ISS CM Only |
| ● | Some - Approximately 15% to 30% Catalyst Beads Present with Gravel, Sand, and Silt |  | SWMU Boundary |
| ● | Traces - Less Than 15% of Catalyst Beads Present |  | Suspected TEL Burial Area |
| ● | Soil Boring - No Catalyst Beads Identified |  | Property Line |
| | | | Tank Status |
|  | Benzene Excavation |  | Demolished |
|  | Benzene Excavation and Sulfate Application |  | Tank Berms |
|  | Sulfate Application |  | Buildings |
| | |  | Sheet Piling |
| | |  | Slurry Wall |

GENERAL NOTE:
Aerial photograph dated October 2017 was provided by Parsons.

SWMU 43
CATALYST BEAD LOCATIONS
AND REMEDIATED AREAS
CATALYST BEADS REPORT



 CHEVRON
ENVIRONMENTAL MANAGEMENT COMPANY
PERTH AMBOY, NEW JERSEY

PROJECT #:	DATE:	DWN:	CHKD:	FIG NO.:
452038-02000	3/24/2020	TDU	JL	8